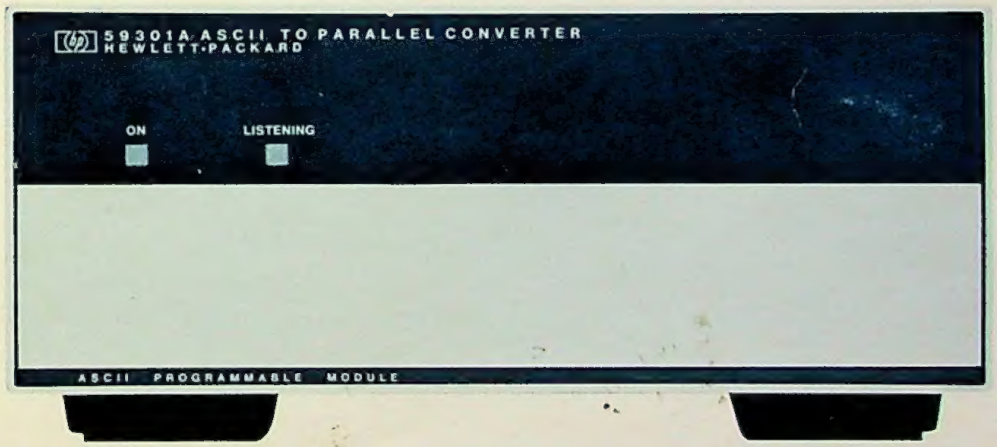
OPERATING AND SERVICE MANUAL

ASCII TO PARALLEL CONVERTER 59301A



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CERTIFICATION

The Hewlett-Packard Company certifies that this instrument was thoroughly tested and inspected and found to meet its published specifications when it was shipped from the factory. The Hewlett-Packard Company further certifies that its calibration measurements are traceable to the U.S. National Bureau of Standards to the extent allowed by the Bureau's calibration facility.

WARRANTY AND ASSISTANCE

This Hewlett-Packard product is warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery, or, in the case of certain major components listed in the manual, for the specified period. We will repair or replace products which prove to be defective during the warranty period provided they are returned to Hewlett-Packard. No other warranty is expressed or implied. We are not liable for consequential damages.

Service contracts or customer assistance agreements are available for Hewlett-Packard products that require maintenance and repair on-site.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office.

ASCII TO PARALLEL CONVERTER
59301A

SERIAL PREFIX: 1328A

This manual applies directly to Hewlett-Packard Model 59301A with serial prefix 1328A. For instruments with serial prefixes above 1328A, a manual change sheet is supplied. For instruments with serial prefixes below 1328A, refer to Section VII.

5301 STEVENS CREEK BLVD., SANTA CLARA, CALIF. 95050

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SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This section provides general information on the Hewlett-Packard Model 59301A ASCII To Parallel Converter including an overall instrument description, equipment supplied, and instrument specifications.

1-3. DESCRIPTION

1-4. The HP 59301A ASCII/Parallel Converter accepts byte-serial ASCII characters on the HP Interface Bus and converts them to parallel output. A rear panel switch selects the output format in either print or hexadecimal form. The print format provides print wheel characters belonging to the set used by the HP 5050B/5050A Printers.

1-5. INSTRUMENT IDENTIFICATION

1-6. Each Hewlett-Packard instrument has a ten-character serial number (e.g., 0000A00000). The four-digit serial prefix identifies a group of identical instruments, and the five-digit suffix is a serial number unique to each instrument. If the serial prefix of your instrument differs from that listed on the title page of this manual, your instrument is different from this manual. For instruments with higher serial prefixes, a manual change sheet is included with this manual. If the manual change sheet is missing, request one from the nearest Hewlett-Packard Sales and Service office listed at the back of this manual. For instruments with lower serial prefixes, refer to the backdating information in Section VII.

1-7. EQUIPMENT SUPPLIED

1-8. Table 1-1 lists the equipment supplied with the 59301A.

Table 1-1. Equipment Supplied

Description	HP Part Number
Detachable Power Cord, 7½ ft. (231 cm) long	8120-1378
HP Interface Bus Interconnect Cable	10631A

1-9. SPECIFICATIONS

1-10. Specifications for the Hewlett-Packard Model 59301A ASCII to Parallel Converter are given in Table 1-2.

Table 1-2. Specifications

ELECTRICAL

Parallel Outputs:
Logic 0 = 0 to .4V (7 mA sink)
Logic 1 = 5V (40 μA source at 2.4V)
Order outputted. Column 1 contains last serial character received by 59301. Column 2 contains next to last character, etc.

Print Command (J1 only):
Negative step +5V to +0.4V for minimum of 20 μs.

Inhibit Command Input (J1 only):
Voltage level within the range from +2.4V to +20V into 5K ohm; must be applied within 20 μs after the negative transition of the print command.

Reference Voltages (output on both J1 and J2):
High = 5V, 20 mA
Low = 0V

DIMENSIONS

Height: 4 inches (101, 6mm)
Width: 8.38 inches (212, 9 mm)
Depth: 11.4 inches (289, 6 mm)
Weight: 3 lb., 12 oz. (1, 70 kg)

SECTION II

INSTALLATION

2-1. INTRODUCTION

2-2. This section contains information for unpacking, inspection, repacking, storage, and installation.

2-3. UNPACKING AND INSPECTION

2-4. If the shipping carton is damaged, ask that the carrier's agent be present when the instrument is unpacked. Inspect the instrument for damage. If the instrument is damaged or fails to meet electrical specifications, notify the carrier and the nearest Hewlett-Packard Sales and Service office immediately (offices are listed at the back of this manual). Retain the shipping carton and padding material for the carrier's inspection. The Sales and Service office will arrange for the repair or replacement of your instrument without waiting for the claim against the carrier to be settled.

2-5. STORAGE AND SHIPMENT

2-6. To protect the ASCII to Parallel Converter during storage or shipment, good commercial packing methods should be used. Reliable commercial packing and shipping companies have the facilities and materials to adequately repack an instrument.

NOTE

Before returning an instrument to Hewlett-Packard, contact the nearest Hewlett-Packard Sales and Service office for instructions.

2-7. Conditions during storage and shipment should normally be limited as follows:

a. Maximum altitude: 25,000 feet.
b. Minimum temperature: -40°F (-40°C).
c. Maximum temperature: +167°F (+75°C).

2-8. POWER REQUIREMENTS

2-9. The ASCII to Parallel Converter operates from either 115 or 230 volts, 50 Hz to 60 Hz AC. Before applying power, the screwdriver-operated switch on the rear panel must be set to the correct position (115 or 230) and the correct fuse (as labeled on the rear panel) must be installed.

SECTION III

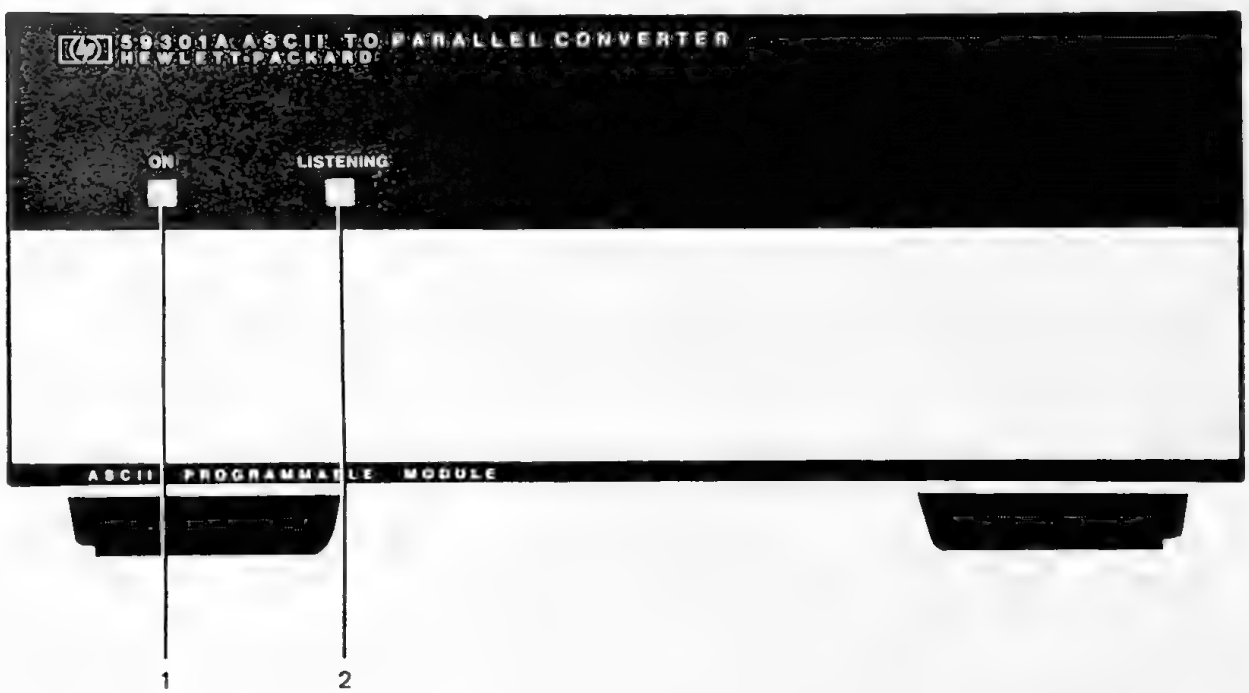
OPERATION AND PROGRAMMING

3-1. INTRODUCTION

3-2. This section contains operating information including controls and indicators, programming, and programming examples.

3-3. CONTROLS, INDICATORS, AND CONNECTORS

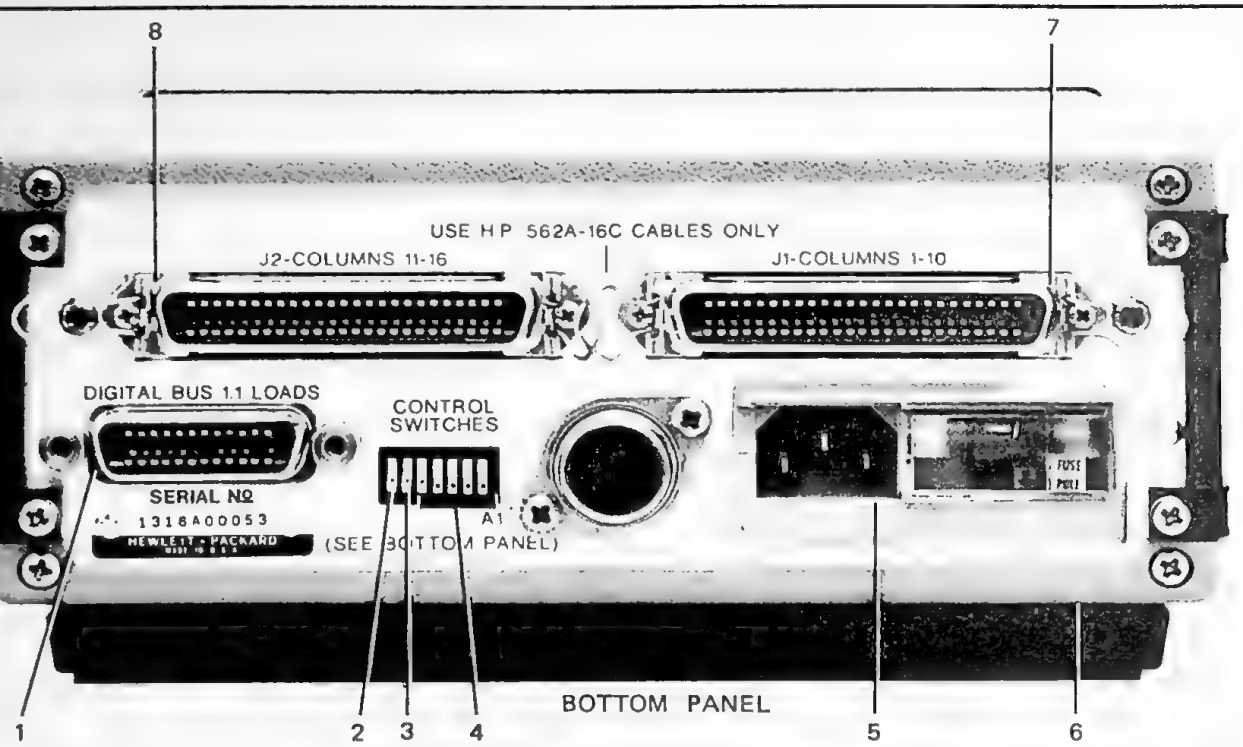
3-4. Figure 3-1 identifies and describes the front panel indicators. Figure 3-2 shows the rear panel connectors and controls.



1. ON indicator: When illuminated, indicates instrument has primary power applied and power supply is operating.

2. LISTENING indicator: When illuminated, indicates instrument is addressed and monitoring the Interface Bus.

Figure 3-1. Front Panel Indicators



1. DIGITAL BUS 1.1 LOADS: 24 pin connector used to convey data and programming instructions to the 59301A.
2. MODE SWITCH: Used to set unit in one of two programming response modes.
   a. Addressable mode: 59301A must be addressed in order to respond to input data.
   b. Listen only mode: 59301A responds to data input without address input.

   Instructions for setting the mode switch are given on the decal indicated on the bottom panel (see 6).
3. FORMAT SWITCH: Used to set 59301A in one of two operating formats.
   a. Printer Format: 59301A converts the ASCII characters 0–9, +, –, . only. All other characters are ignored. (See Table 3-1 for exact output code.)
   b. Hexadecimal Format: 59301 converts most ASCII characters into negative true hexadecimal. (See Table 3-2 for exact conversions.)
4. ADDRESS SWITCHES (last five switches): These switches are used to assign an address code to the 59301A. Allowable codes and their ASCII equivalents are identified on the decal on the bottom panel. (See 6.)
5. AC POWER MODULE: Input power module consisting of an I.E.C. approved connector, a fuse, (.3 Amp 115 Vac, .15 Amp 230 Vac), and a 115/230 line voltage switch and filter capacitors. Design of module prevents fuse or switch change when ac power line is connected. The switch cannot be changed unless the fuse is removed.
6. DECAL (bottom cover): This decal contains instructions for setting the mode switch, format switch, and address switches as well as part of the ASCII to Printer and Hexadecimal conversion format tables.
7. J1-COLUMNS 1–10: 50-pin connector for digital recorder interconnection.
8. J2-COLUMNS 11–16. 50-pin connector for digital recorder interconnection.

Figure 3-2. Rear Panel Controls and Connectors

3-5. PROGRAMMING

3-6. The 59301A operates in response to a specific set of programming codes. The ASCII codes used in the Printer Format mode of operation are shown in Table 3-1. The codes used in the Hexadecimal Format are shown in Table 3-2. A sample program for the 59301A illustrating the use of these codes is depicted in Table 3-4.

3-7. SPECIAL ACTION CODES. The 59301A has a set of special codes that it will respond to. The codes are of two forms, codes present when MRE is high (i.e. ≥+2.4V) and codes present when MRE is low (i.e. ≤+.5V). Table 3-3 lists these codes and the response of the 59301A.

Table 3-1. Printer Format Codes

Input	Output				Printed Character (Standard Print Wheel) 5050A/B and 5055A
ASCII	b_3	b_2	b_1	b_0	
0	0	0	0	0	0
1	0	0	0	1	1
2	0	0	1	0	2
3	0	0	1	1	3
4	0	1	0	0	4
5	0	1	0	1	5
6	0	1	1	0	6
7	0	1	1	1	7
8	1	0	0	0	8
9	1	0	0	1	9
+	1	0	1	0	+
-	1	0	1	1	-
(DP)	1	1	1	1	*
All other input codes ignored.					

Table 3-2. Hexadecimal Format Codes

Input						Output			
ASCII	(Alternate)					b_3	b_2	b_1	b_0
0	/	—				1	1	1	1
1	.					1	1	1	0
2	-	]				1	1	0	1
3	,					1	1	0	0
4	+	[				1	0	1	1
5	*	Z				1	0	1	0
6	)	Y				1	0	0	1
7	(	X	O			1	0	0	0
8	'	W	N			0	1	1	1
9	&	V	M			0	1	1	0
A	:	%	U	L		0	1	0	1
B	;	$	T	K		0	1	0	0
C	<	#	S	J		0	0	1	1
D	=	"	R	I		0	0	1	0
E	>	!	Q	H		0	0	0	1
F	?	SP	P	G	@	0	0	0	0

Table 3-3. Special Action Codes

Name	MRE	DIO Lines								ASCII Equiv.	59301 Response
		8	7	6	5	4	3	2	1		
Unlisten	1	X	0	1	1	1	1	1	1	?	Unit responds by not converting any characters until it again receives its address mode.
Address Code	1	X	0	1	A_5*	A_4*	A_3*	A_2*	A_1*		Unit responds by converting characters on DIO lines when MRE = 0.
Line feed	0	X	0	0	0	1	0	1	0	LF	Unit outputs negative print command at J1 indicating it is ready to output its parallel information.

*A_5 – A_1 must match code set on address switch. X = don't care (can be 1 or 0).

Table 3-4. 59301A Programming Example

Sequence	Control Lines		Data Lines ASCII Codes	Description of Program Sequence
	EOP	MRE		
1	H	L	?	Clears all listeners
2	H	L	1	Listen address- must correspond to rear panel switch settings
3	H	H		59301A ready for data Data is on data lines—refer to Tables 3-1 and 3-2 for allowable codes.
4	H	H	LF	Indicates end of serial data string (16 maximum) 59301A outputs print command
5 •	H	H		Repeat steps 3 and 4.

SECTION IV
THEORY OF OPERATION

4-1. INTRODUCTION

4-2. This section contains integrated circuit operation and a description of the 59301A functional block diagram.

4-3. INTEGRATED CIRCUIT OPERATION

4-4. Eight-bit Serial-in Parallel-out Shift Register, 1820-0294

4-5. This IC (Figure 4-1) accepts serial input data and provides parallel outputs. The unit consists of eight RS flip-flops connected in a shift register configuration. Clocking occurs on the positive going edge of the clock pulse. Input gates are provided for the RS inputs to allow for strobe capability. Logic 1 levels at the data terminals enter logical "1's" into the shift register. When the clear input (pin 9) is driven low, all flip-flops are asynchronously set to the logical 0 state.

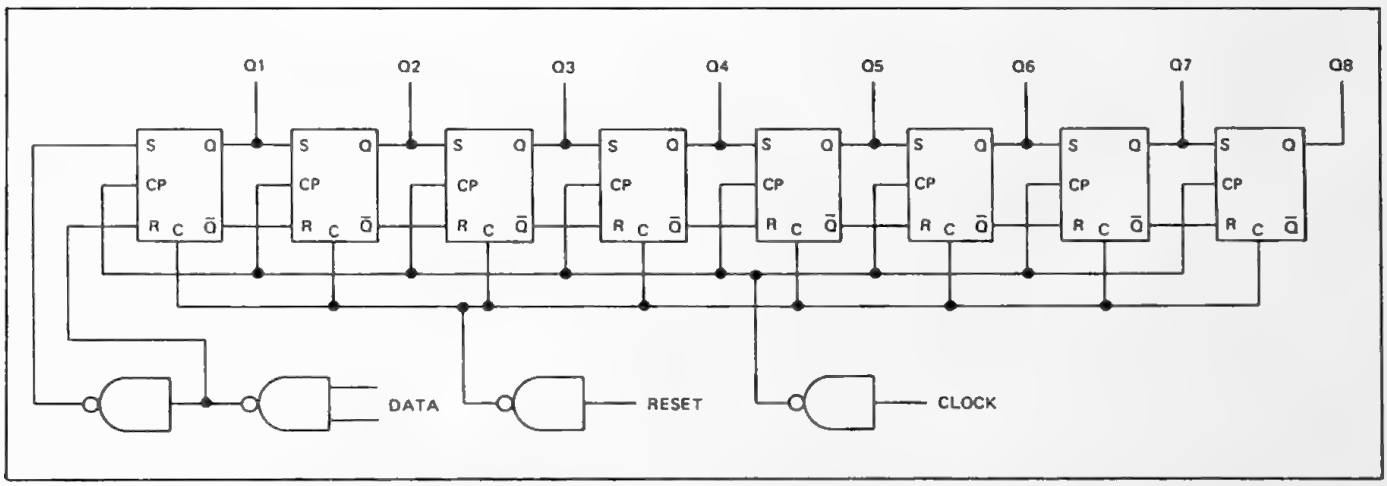


Figure 4-1. Eight-bit Serial-in Parallel-out Shift Register, 1820-0294

4-6. 1024-bit Read-only-memory, 1816-0257

4-7. The Read-only-memory (ROM) illustrated in Figure 4-2 is a 1024-bit ROM whose output is organized into 256 words by four bits. An 8-bit code is used to select the desired output word. The four outputs are open-collector which permit "OR" tying of the outputs to the same line. Logic lows are required at inputs CS1 and CS2 to activate the ROM.

4-8. FUNCTIONAL BLOCK DIAGRAM DESCRIPTION

4-9. Figure 4-3 illustrates the functional block diagram for the 59301A ASCII to Parallel Converter. The 59301A consists of five major circuit groups: BUS CONTROL, DECODER, PRINTER CONTROL, TIMING AND RESET, and SERIAL TO PARALLEL CONVERTER.

4-10. The three wire handshake input/output (RFD, DAV, and DAC) to the BUS CONTROL synchronizes all operations occurring in the ASCII to Parallel Converter. During the address mode, for example, the system controller drives the MRE line low, indicating the address mode to the 59301. After the ASCII to Parallel Converter indicates it is ready for data by setting RFD high,

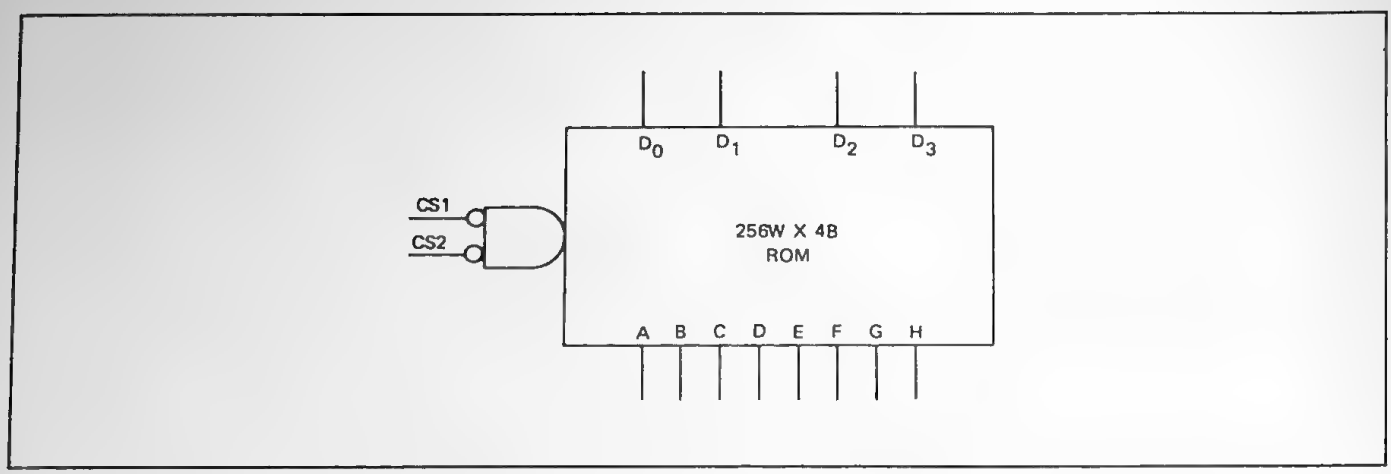


Figure 4-2. Read-only-memory, 1816-0257

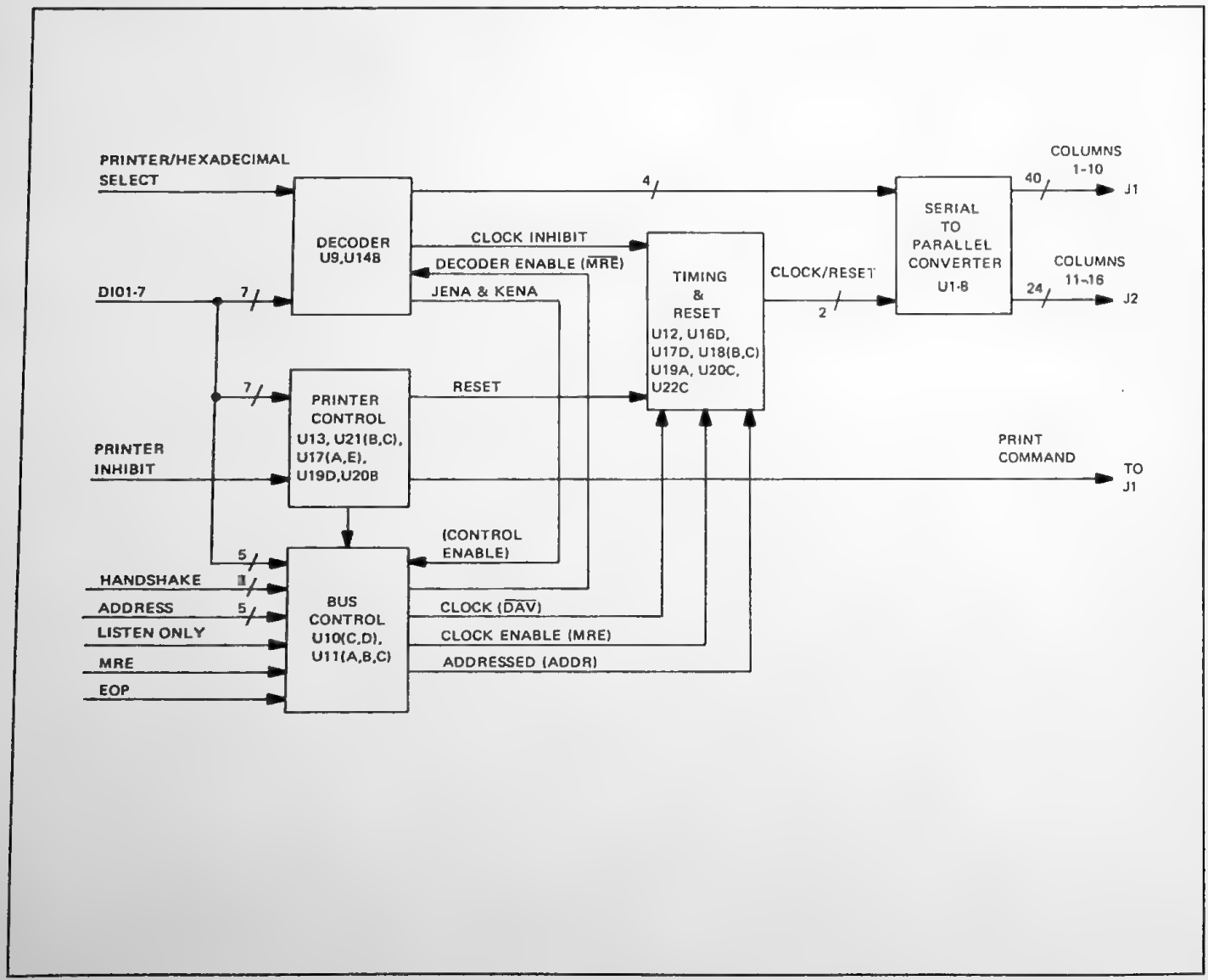


Figure 4-3. Functional Block Diagram

the system controller applies an address to the data lines (DIO1-DIO7). If the address is a listen address, the DECODER will enable the BUS CONTROL. When enabled, the BUS CONTROL compares the input address with the five wire address input from the rear panel mounted CONTROL SWITCHES. If the two inputs are the same, a clock enable is applied to the TIMING AND RESET when the system controller sets DAV (Data Valid) low. After the 59301 has accepted the input data, the DAC (Data Accepted) line is set high, allowing the process to repeat. Each step of the handshake cycle must be completed before the cycle can proceed to the next step.

4-11. The clock enable output from the BUS CONTROL allows the TIMING AND RESET to clock data into the SERIAL TO PARALLEL CONVERTER during the data mode. The TIMING AND RESET is also enabled when Listen Only (part of the CONTROL SWITCHES) is high. When enabled, the TIMING AND RESET produces a clock output whenever the DAV line is set low. The DAV line set low results in a clock ($\overline{DAV}$) output from the BUS CONTROL. The TIMING AND RESET does not generate a clock output during the address mode because the clock ($\overline{DAV}$) output from the BUS CONTROL is inhibited when MRE is low.

4-12. During the data mode, the MRE line is high which enables the clock ($\overline{DAV}$) output to the TIMING AND RESET. When the RFD line is set high by the 59301A, the bus talker applies data to the bus data lines. The DECODER converts the 7-bit ASCII input to a 4-bit output to the SERIAL TO PARALLEL CONVERTER. This data is strobed into the SERIAL TO PARALLEL CONVERTER by the TIMING AND RESET when the DAV line goes low. The 59301A indicates it has accepted the data by setting DAC high, allowing the cycle to repeat.

4-13. At the end of a serial data string, a (LF) (linefeed) ASCII character is applied to the data lines by the talker. The PRINTER CONTROL, by continuously monitoring the data lines, senses the (LF) input and applies a print command output to J1. In response to a printer inhibit input, the PRINTER CONTROL outputs a reset pulse to the TIMING AND RESET which, in turn, applies a reset to the SERIAL TO PARALLEL CONVERTER.

4-14. The 59301A accepts any ASCII character specified by the chosen format. The printer format converts only ASCII 0 through 9, +, -, and •. Any other ASCII character input to the 59301A during the printer mode of operation results in an inhibit applied to the TIMING AND RESET. The hexadecimal format responds to all printable ASCII inputs and provides for the manipulation of all four bits on each of the 16 parallel characters outputted by the DECODER. The printer format is restricted to 13 character outputs from the DECODER.

SECTION V

MAINTENANCE

5-1. INTRODUCTION

5-2. This section contains maintenance and service information including a table of recommended test equipment, an in-cabinet performance check, and troubleshooting.

5-3. TEST EQUIPMENT

5-4. Table 5-1 lists test equipment recommended for maintaining and checking the performance of the 59301A. Test equipment having equivalent characteristics may be substituted for the equipment listed.

5-5. IN-CABINET PERFORMANCE CHECK

5-6. Table 5-2 contains the in-cabinet performance check. An HP Interface Bus controller, as defined in the HP Interface Bus User's Manual, is required to provide signal inputs to the 59301A. If a controller is not available, an HP Interface Bus talker, as defined in the HP Interface Bus User's Manual, can be used. However, a talker cannot check the addressable mode of the 59301A.

5-7. The HP 5050B Digital Recorder should be used to monitor the signal output of the 59301A if worst case loading is expected. If worst case loading is not expected, the HP 5050A Digital Recorder or an equivalent TTL monitoring device can be used.

NOTE

The HP 5050B should not have options 003, 50/51, 60/61, and zero suppression must be defeated.

Table 5-1. Recommended Test Equipment

Instrument	Required Characteristics	Recommended
Logic Probe	Logic State Tests	HP 10525T
Logic Pulser	Logic State Tests	HP 10526T
Digital Voltmeter	0 to +175 volts, Accuracy .3%	HP 3480A and 3482A
Digital Recorder	Monitor and display of Printer and Hexadecimal Format (TTL levels)	HP 5050B

Table 5-2. In-cabinet Performance Check

1. On rear panel of 59301A, set voltage selector switch in the AC power module to correspond with line voltage to be used (115V or 230V). Install correct line fuse and connect 59301A to power source. The ON light should illuminate.

2. Connect equipment as illustrated in the above diagram.

3. ADDRESSABLE MODE CHECK

   a. On 59301A rear panel, set mode switch to the addressable position.
   b. Set the 59301A rear panel address switches to the following code:

A_5	A_4	A_3	A_2	A_1	ASCII Equivalent
0	0	0	0	0	SP

   c. Program the Bus controller to apply the above ASCII code to the Bus data lines. Check that 59301A LISTENING indicator illuminates.

   d. Program the Bus controller to apply the Unlisten Code to the Bus data lines. Check that 59301A LISTENING indicator extinguishes.

A_7	A_6	A_5	A_4	A_3	A_2	A_1	ASCII Equivalent
1	1	1	1	1	1	1	?

   e. Repeat steps b thru d for the following codes:

A_5	A_4	A_3	A_2	A_1	ASCII Equivalent
0	0	0	0	1	!
0	0	0	1	1	#
0	0	1	1	1	'
0	1	1	1	1	/
1	1	1	1	0	>

Table 5-2. In-cabinet Performance Check (Cont'd)

4. EOP CHECK

   a. Program the Bus controller to apply the 59301A listen address to the Bus data lines. Check that 59301A LISTENING indicator illuminates.

   b. Program the Bus controller to set the EOP Bus signal line low. Check that 59301A LISTENING indicator extinguishes.

   c. Program the Bus controller to set the EOP Bus signal line back to high. Check that 59301A LISTENING indicator remains extinguished.

5. LISTEN ONLY MODE

   a. Set the 59301A mode switch to the listen only position. Check that 59301A LISTENING indicator illuminates.

   b. Apply the unlisten code to the Bus data lines. The 59301A LISTENING indicator should remain illuminated.

   c. Pull the EOP Bus signal line low and then back high. The 59301A LISTENING indicator should remain illuminated in both cases.

6. FORMAT SWITCH CHECK

   a. Set the 59301A mode switch to the addressable position.

   b. Set the 59301A format switch to the printer format position.

   c. As shown in Table 3-4, apply an address and data information (acceptable data codes are listed in Table 3-1) to the 59301A. Check for the following:

      1. The 59301A properly converts the ASCII inputs. Any other ASCII inputs not listed in Table 3-1 should not be converted.

      2. Outputs sixteen columns at a time.

      3. 59301 responds to positive (+) inhibit (does not present new information or take away old information before printer is ready).

      4. 59301 presents negative (–) print command (i.e., printer is printing).

      5. 59301 outputs information and negative (–) print command each time ASCII LF is applied to the data lines.

   d. On 59301A rear panel, set format switch to hexadecimal position.

   e. Repeat step c. for hexadecimal codes. Acceptable data codes for the hexadecimal format are contained in Table 3-2.

5-8. TROUBLESHOOTING

5-9. To facilitate troubleshooting the 59301A, refer to Table 5-3, Trouble Isolation. Table 5-3 gives the signals present on test points at J4 on the front edge of the board when the unit is properly functioning. See Figure 8-3 for location of test points on schematic diagram and component locator.

Table 5-3. Trouble Isolation

J4 Test Point Number	Test Point Name	Tests
1	ROM ENABLE	High when DIO 6 & 7 are not alike, otherwise low.
2	LF DETECTOR ENABLE	(MRE STROBE ADDRESSED). TP2 will go high whenever MRE & STROBE & LISTEN F/F are all high.
3	PRINTER MODE SUPPRESSION	Output is high whenever ROM output code is 1110 and 59301 is in printer mode. Output is low for all other ROM codes or when 59301 is in hexadecimal mode.
4	HANDSHAKE ENABLE	Will be high if MRE = 1 or unit is addressed to listen or Mode Switch is in Listen Only mode. High enables RFD & DAC drivers.
5	POWER-UP RESET	Low at turn-on, takes approximately 600 ms to charge up to TTL high.
6	"A" BIT OF OUTPUT DATA	State depends on character that is converted. See conversion tables in Section III for more information.
7	CLOCK FOR HANDSHAKE	Output of Strobe One-shot, used to clock Handshake F/F. Pulses to TTL low.
8	"D" BIT OF OUTPUT DATA	State depends on character that is converted and format of output. See conversion tables in Section III for more information.
9	LF DETECTOR	Low when linefeed is present on DIO lines and TP2 is high.
10	"C" BIT OF OUTPUT DATA	State depends on character that is converted and format of output. See conversion tables in Section III for more information.
11	"B" BIT OF OUTPUT DATA	State depends on character that is converted and format of output. See conversion tables in Section III for more information.
12	DAV·POWER-UP RESET	Once TP5 is high, the state of this point will be the opposite of DAV line, i.e., TP12 + $\overline{DAV}$.
13	OUTPUT OF HANDSHAKE F/F	Low after each TP7 pulse, high after each TP12 pulse.
14	CLOCK PULSE TO SHIFT REGISTERS	Pulses to TTL low at same time as TP-2 when TP-1 and TP-3 are high. Low if TP-1, 2, or 3 is low.
15	CLEAR ONE SHOT OUTPUT	Pulses to TTL high, and clears all information in output registers. Once TP5 is high triggered by + Inhibit line going low. This one-shot is trailing edge triggered.
16	ADDRESS COMP. OUTPUT	Low when $A_1 - A_5$ and DIO 1 – 5 are in like states. High at all other times.
17	+INHIBIT LINE	High when + Inhibit from printer is low and visa versa.

Table 5-3. Trouble Isolation (Cont'd)

J4 Test Point Number	Test Point Name	Tests
18	CLOCK FOR LISTEN F/F	(MRE · STROBE) Pulse high when MRE = 1. Otherwise low.
19	5V and H_{REF}	+5V
20	5V and H_{REF}	+5V
21	GROUND and L_{REF}	0V
22	GROUND and L_{REF}	0V

Table 5-4. Performance Check Test Card

Hewlett-Packard Model 59301A	Test Performed by _____
Instrument Serial No. _____	Date _____
1. Unit responds properly to all addresses.	_____
2. LISTENING indicator goes out when EOP goes low	_____
3. Unit performs properly in Listen Only mode.	_____
4. Unit performs properly in Printer Format mode.	_____
5. Unit performs properly in Hexadecimal Format mode.	_____

SECTION VI

REPLACEABLE PARTS

6-1. INTRODUCTION

6-2. This section contains information for ordering replaceable parts. Table 6-1 lists replaceable parts for the ASCII to Parallel Converter. Table 6-2 lists the mechanical parts. Figure 6-1 identifies the cabinet parts. Table 6-3 contains a list of manufacturers and their respective codes.

6-3. Parts are listed in alpha-numerical order of their reference designator starting with A1 and ending with chassis and miscellaneous parts. The replaceable parts table includes the following information.

a. Reference designator (when applicable).
b. HP part number.
c. Total quantity (Qty) used in the instrument.
d. Description of the part (see abbreviations below).

6-4. ORDERING INFORMATION

6-5. To obtain replacement parts, address order of inquiry to your local Hewlett-Packard Sales and Service Office. Identify parts by their Hewlett-Packard part number.

6-6. To obtain a part that is not listed, include:

a. Instrument model number.
b. Instrument serial number.
c. Description of the part.
d. Function and location of the part.

REFERENCE DESIGNATIONS

A	= assembly	E	= miscellaneous electrical part	P	= electrical connector (movable portion); plug	U	= integrated circuit; microcircuit
AT	= attenuator; isolator; termination	F	= fuse	Q	= transistor; SCR; triode thyristor	V	= electron tube
B	= fan; motor	FL	= filter	R	= resistor	VR	= voltage regulator; breakdown diode
BT	= battery	H	= hardware	RT	= thermistor	W	= cable; transmission path; wire
C	= capacitor	HY	= circulator	S	= switch	X	= socket
CP	= coupler	J	= electrical connector (stationary portion); jack	T	= transformer	Y	= crystal unit–piezoelectric
CR	= diode; diode thyristor; varactor	K	= relay	TB	= terminal board	Z	= tuned cavity; tuned circuit
DC	= directional coupler	L	= coil; inductor	TC	= thermocouple		
DL	= delay line	M	= meter	TP	= test point		
DS	= annunciator; signaling device (audible or visual); lamp; LED	MP	= miscellaneous mechanical part				

ABBREVIATIONS

A	= ampere	avg	= average	CHAN	= channel	dc	= direct current
ac	= alternating current	AWG	= American wire gauge	cm	= centimeter	deg	= degree (temperature interval or difference)
ACCESS	= accessory			CMO	= cabinet mount only		
ADJ	= adjustment	BAL	= balance	COAX	= coaxial	°	= degree (plane angle)
A/D	= analog-to-digital	BCD	= binary coded decimal	COEF	= coefficient	°C	= degree Celsius (centigrade)
AF	= audio frequency			COM	= common		
AFC	= automatic frequency control	BD	= board	COMP	= composition	°F	= degree Fahrenheit
		BE CU	= beryllium copper	COMPL	= complete	°K	= degree Kelvin
AGC	= automatic gain control	BFO	= beat frequency oscillator	CONN	= connector	DEPC	= deposited carbon
				CP	= cadmium plate	DET	= detector
AL	= aluminum	BH	= binder head	CRT	= cathode-ray tube	diam	= diameter
ALC	= automatic level control	BKDN	= breakdown	CTL	= complementary transistor logic	DIA	= diameter (used in parts list)
		BP	= bandpass				
AM	= amplitude modulation	BPF	= bandpass filter	CW	= continuous wave	DIFF AMPL	= differential amplifier
		BRS	= brass	cw	= clockwise		
AMPL	= amplifier	BWO	= backward-wave oscillator	cm	= centimeter	div	= division
APC	= automatic phase control			D/A	= digital-to-analog	DPDT	= double-pole, double-throw
		CAL	= calibrate	dB	= decibel		
ASSY	= assembly	ccw	= counterclockwise	dBm	= decibel referred to 1 mW	DR	= drive
AUX	= auxiliary	CER	= ceramic				

ABBREVIATIONS

DSB	= double sideband
DTL	= diode transistor logic
DVM	= digital voltmeter
ECL	= emitter coupled logic
EMF	= electromotive force
EDP	= electronic data processing
ELECT	= electrolytic
ENCAP	= encapsulated
EXT	= external
F	= farad
FET	= field-effect transistor
F/F	= flip-flop
FH	= flat head
FIL H	= fillister head
FM	= frequency modulation
FP	= front panel
FREQ	= frequency
FXD	= fixed
g	= gram
GE	= germanium
GHz	= gigahertz
GL	= glass
GND	= ground(ed)
H	= henry
h	= hour
HET	= heterodyne
HEX	= hexagonal
HD	= head
HDW	= hardware
HF	= high frequency
HG	= mercury
HI	= high
HP	= Hewlett-Packard
HPF	= high pass filter
HR	= hour (used in parts list)
HV	= high voltage
Hz	= Hertz
IC	= integrated circuit
ID	= inside diameter
IF	= intermediate frequency
IMPG	= impregnated
in	= inch
INCD	= incandescent
INCL	= include(s)
INP	= input
INS	= insulation
INT	= internal
kg	= kilogram
kHz	= kilohertz
kΩ	= kilohm
kV	= kilovolt
lb	= pound
LC	= inductance-capacitance
LED	= light-emitting diode
LF	= low frequency
LG	= long
LH	= left hand
LIM	= limit
LIN	= linear taper (used in parts list)
lin	= linear
LK	
WASH	= lock washer
LO	= low; local oscillator
LOG	= logarithmic taper (used in parts list)
log	= logarithm(ic)
LPF	= low pass filter
LV	= low voltage
m	= meter (distance)
mA	= milliampere
MAX	= maximum
MΩ	= megohm
MEG	= meg (10^6) (used in parts list)
MET FLM	= metal film
MET OX	= metal oxide
MF	= medium frequency; microfarad (used in parts list)
MFR	= manufacturer
mg	= milligram
MHz	= megahertz
mH	= millihenry
mho	= mho
MIN	= minimum
min	= minute (time)
′	= minute (plane angle)
MINAT	= miniature
mm	= millimeter
MOD	= modulator
MOM	= momentary
MOS	= metal-oxide semiconductor
ms	= millisecond
MTG	= mounting
MTR	= meter (indicating device)
mV	= millivolt
mVac	= millivolt, ac
mVdc	= millivolt, dc
mVpk	= millivolt, peak
mV p-p	= millivolt peak-to-peak
mVrms	= millivolt, rms
mW	= milliwatt
MUX	= multiplex
MY	= mylar
μA	= microampere
μF	= microfarad
μH	= microhenry
μmho	= micromho
μs	= microsecond
μV	= microvolt
μVac	= microvolt, ac
μVdc	= microvolt, dc
μVpk	= microvolt, peak
μVp-p	= microvolt, peak-to-peak
μVrms	= microvolt, rms
μW	= microwatt
nA	= nanoampere
NC	= no connection
N/C	= normally closed
NE	= neon
NEG	= negative
nF	= nanofarad
NI PL	= nickel plate
N/O	= normally open
NOM	= nominal
NORM	= normal
NPN	= negative-positive-negative
NPO	= negative-positive zero (zero temperature coefficient)
NRFR	= not recommended for field replacement
NSR	= not separately replaceable
ns	= nanosecond
nW	= nanowatt
OBD	= order by description
OD	= outside diameter
OH	= oval head
OP AMPL	= operational amplifier
OPT	= option
OSC	= oscillator
OX	= oxide
oz	= ounce
Ω	= ohm
P	= peak (used in parts list)
PAM	= pulse-amplitude modulation
PC	= printed circuit
PCM	= pulse-code modulation; pulse-count modulation
PDM	= pulse-duration modulation
pF	= picofarad
PH BRZ	= phosphor bronze
PHL	= Phillips
PIN	= positive-instrinsic-negative
PIV	= peak inverse voltage
pk	= peak
PL	= phase lock
PLO	= phase lock oscillator
PM	= phase modulation
PNP	= positive-negative-positive
P/O	= part of
POLY	= polystyrene
PORC	= porcelain
POS	= positive, position(s) (used in parts list)
POSN	position
POT	potentiometer
p-p	= peak-to-peak
PP	peak-to-peak (used in parts list)
PPM	= pulse-position modulation
PREAMPL	= preamplifier
PRF	pulse-repetition frequency
PRR	pulse repetition rate
ps	picosecond
PT	point
PTM	= pulse-time modulation
PWM	= pulse-width modulation
PWV	= peak working voltage
RC	= resistance-capacitance
RECT	= rectifier
REF	= reference
REG	= regulated
REPL	= replaceable
RF	= radio frequency
RFI	= radio frequency interference
RH	= round head, right hand
RLC	= resistance-inductance-capacitance
RMO	= rack mount only
rms	= root-mean-square
RND	= round
ROM	= read-only memory
R&P	= rack and panel
RWV	= reverse working voltage
S	= scattering parameter
s	= second (time)
″	= second (plane angle)
S-B	= slow-blow (fuse) (used in parts list)
SCR	= silicon controlled rectifier; screw
SE	= selenium
SECT	= sections
SEMICON	= semiconductor
SHF	= superhigh frequency
SI	= silicon
SIL	= silver
SL	= slide
SNR	= signal-to-noise ratio
SPDT	= single-pole, double-throw
SPG	= spring
SR	= split ring
SPST	= single-pole, single-throw
SSB	= single sideband
SST	= stainless steel
STL	= steel
SQ	= square
SWR	= standing-wave ratio
SYNC	= synchronize
T	= timed (slow-blow fuse)
TA	= tantalum
TC	= temperature compensating
TD	= time delay
TERM	= terminal
TFT	thin-film transistor
TGL	= toggle
THD	= thread
THRU	= through
TI	= titanium
TOL	= tolerance
TRIM	= trimmer
TSTR	= transistor
TTL	= transistor transistor logic
TV	= television
TVI	= television interference
TWT	= traveling wave tube
U	= micro (10^{-6}) (used in parts list)
UF	= microfarad (used in parts list)
UHF	= ultrahigh frequency
UNREG	= unregulated
V	= volt
VA	= voltampere
Vac	= volts, ac
VAR	= variable
VCO	= voltage-controlled oscillator
Vdc	= volts, dc
VDCW	= volts, dc, working (used in parts list)
V(F)	= volts, filtered
VFO	= variable-frequency oscillator
VHF	= very-high frequency
Vpk	= volts, peak
Vp-p	= volts, peak to-peak
Vrms	= volts, rms
VSWR	= voltage standing wave ratio
VTO	= voltage-tuned oscillator
VTVM	= vacuum tube voltmeter
V(X)	= volts, switched
W	= watt
W/	= with
WIV	= working inverse voltage
WW	= wirewound
W/O	= without
YIG	= yttrium-iron-garnet
Zo	= characteristic impedance

NOTE

All abbreviations in the parts list will be in upper case

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

Table 6-1. Replaceable Parts, 59301A ASCII to Parallel Converter

REF. DESIG.	HP PART NO.	QTY	DESCRIPTION	MFR. CODE	MFR. PART NO.
A1	59301-60001	1	BD ASSY - PAR OUTPUT	28480	59301-60001
A1C1	0180-2101	1	C:FXD ELECT 4000 μF +75 -10% 15 VDCW	28480	0180-2101
A1C2	0180-3879	2	C:FXD CER 0.01 μF 20% 100 VDCW	72982	8121-B112-X7R-103M
A1C3	0160-0158	3	C:FXD MY 0.0056 μF 10% 200 VDCW	56289	292P56292-PTS
A1C4	0180-0106	1	C:FXD ELECT 60 μF 20% 6 VDCW	28480	0180-0106
A1C5	0160-0158		C:FXD MY 0.0056 μF 10% 200 VDCW	56289	292P56292-PTS
A1C6	0160-0153	1	C:FXD MY 0.001 μF 10% 200 VDCW	56289	192P10292-PTS
A1C7	0160-0158		C:FXD MY 0.0056 μF 10% 200 VDCW	56289	292P56292-PTS
A1C8	0160-0205	1	C:FXD MY 10 pF 10% 500 VDCW	28480	0160-0205
A1C9	0160-3878		C:FXD CER 0.01 μF 20% 100 VDCW	72982	8121-B112-X7R-103M
A1CR1	1901-0040	2	DIODE: SILICON 50 MA 30 WV	07263	FDG1088
A1CR2	1901-0327	2	DIODE: SILICON 1.0A 200 WV	03508	A14B
A1CR3	1901-0327		DIODE: SILICON 1.0A 200 WV	03508	A14B
A1CR4	1901-0040		DIODE: SILICON 50 MA 30 WV	07263	FDG1088
A1DS1	2140-0388	2	LAMP: INCANDESCENT	71744	CM-8640
A1DS2	2140-0388		LAMP: INCANDESCENT	71744	CM-8640
A1J1	1251-0087	2	CONNECTOR: RACK AND PANEL MICRO-RIBBON 50 PIN	02660	57-40500-375
A1J2	1251-0087		CONNECTOR: RACK AND PANEL MICRO-RIBBON 50 PIN	02660	57-40500-375
A1Q1	1854-0094	2	TSTR: NPN SILICON	07263	2N3646
A1Q2	1854-0094		TSTR: NPN SILICON	07263	2N3646
A1R1	0683-1025	9	R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R2	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R3	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R4	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R5	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R6	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R7	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R8	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R9	0683-1025		R:FXD COMP 1000 OHM 5% ¼W	01121	CB1025
A1R10	0683-1035	1	R:FXD COMP 10K OHM 5% ¼W	01121	CB1035
A1R11	0683-1215	3	R:FXD COMP 120 OHM 5% ¼W	01121	CB1215
A1R12	0683-1215		R:FXD COMP 120 OHM 5% ¼W	01121	CB1215
A1R13	0683-2725	4	R:FXD COMP 2700 OHMS 5% ¼W	01121	CB2725
A1R14	0683-2725		R:FXD COMP 2700 OHMS 5% ¼W	01121	CB2725
A1R15	0683-2725		R:FXD COMP 2700 OHMS 5% ¼W	01121	CB2725
A1R16	0683-2725		R:FXD COMP 2700 OHMS 5% ¼W	01121	CB2725
A1R17	0683-5125	1	R:FXD COMP 5100 OHMS 5% ¼W	01121	CB5125
A1R18	0683-4725	1	R:FXD COMP 4700 OHMS 5% ¼W	01121	CB4725
A1R19	0683-1215		R:FXD COMP 120 OHM 5% ¼W	01121	CB1215
A1RP1	1810-0055	8	R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP2	1810-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP3	1810-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP4	1810-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP5	1810-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP6	1818-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP7	1810-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR
A1RP8	1810-0055		R:NETWORK 8 RES. 10K OHM 5% ⅛W	56289	200C1793-CRR

Table 6-1. Replaceable Parts, 59301A ASCII to Parallel Converter (Cont'd)

REF. DESIG.	HP PART NO.	QTY	DESCRIPTION	MFR. CODE	MFR. PART NO.
A1RP9	1810-0041	2	R:NETWORK 8 RES. 2.7K OHM 5%	28480	1810-0041
A1RP10	1810-0041		R:NETWORK 8 RES. 2.7K OHM 5%	28480	1810-0041
A1T1	9100-3030	1	TRANSFORMER: POWER	28480	9100-3030
A1U1	1820-0294	8	IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG.	12040	DM8570N
A1U2	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG.	12040	DM8570N
A1U3	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG.	12040	DM8570N
A1U4	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG	12040	DM8570N
A1U5	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG	12040	DM8570N
A1U6	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG.	12040	DM8570N
A1U7	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG.	12040	DM8570N
A1U8	1820-0294		IC: TTL 8-BIT SER-IN PAR-OUT SHIFT REG.	12040	DM8570N
A1U9	1816-0257	1	IC: TTL SPEC	28480	1816-0257
A1U10	1820-0598	2	IC: TTL LP QUAD 2-INPUT EXCLUSIVE OR GATE	12040	DM74L86N
A1U11	1820-0598		IC: TTL LP QUAD 2-INPUT EXCLUSIVE OR GATE	12040	DM74L86N
A1U12	1820-0515	1	IC: TTL DUAL RE-TRIG/RE-SET MONO-MULTI	07263	U7B960259X
A1U13	1920-0589	1	IC:TTL LP 8-INPUT NAND GATE	12040	DM74L30N
A1U14	1820-0985	1	IC: DTL 1800	04713	SC16284PK
A1U15	1820-0595	1	IC: TTL LP DUAL J-K M/S FF	12040	DM74L73N
A1U16	1820-0584	2	IC: TTL LP QUAD 2-INPUT NOR GATE	12040	DM74L02N
A1U17	1820-0174	1	IC: TTL HEX INVERTER	01295	SN7404N
A1U18	1820-0587	1	IC: TTL LP TRIPLE 3-INPUT NAND GATE	12040	DM74L10N
A1U19	1820-0584		IC: TTL LP QUAD 2-INPUT NOR GATE	12040	DM74L02N
A1U20	1820-1056	1	IC: TTL QUAD 2-INPUT NAND SCHMITT TRIGGER	01295	SN74132
A1U21	1820-0586	1	IC: TTL LP HEX INVERTER	12040	DM74L04N
A1U22	1820-0621	1	IC: TTL QUAD 2-INPUT NAND BUFFER OPEN COLLECTOR	01295	SN7438N
A1XU9	1200-0423	1	SOCKET IC 16 PIN	28480	1200-0423
A2	59301-60002	1	BD ASSY - I/O	28480	59301-60002
A2CR1	1901-0040	1	DIODE: SILICON 50 MA 30 WV	07263	FDG1088
A2J1	1200-0485	1	SOCKET I.C. 14 PIN	28480	1200-0485
A2P1	1251-3283	1	CONN MICRO RIBBON 24 PIN	02660	57-20240-2
A2RP1	1810-0136	2	RESISTOR NETWORK	28480	1810-0136
A2RP2	1810-0136		RESISTOR NETWORK	28480	1810-0136
A2S1	3101-1826	1	SWITCH ASSY. ROCKER DIP (7 SWITCHES)	02660	435166-1
	1200-0485	1	SOCKET: IC	28480	1200-0485
A2W1	8120-0594	1	CABLE ASSY 5.0 IN (12.5 CM) W/24 PIN CONNECTOR	28480	8120-0594
			CHASSIS PARTS		
C1	0180-1735	1	C:FXD TANT .22 μF ±10% 35 WVDC	56289	150D224X 9035A2-DYS
U1	1820-0430	1	IC: VOLTAGE REGULATOR 5V ±0.020V	12040	LM309K
XU1	1200-0041	1	TSTR SOCKET TO-3 PACKAGE	71785	133-32-10-013
F1	2110-0007	1	FUSE, 1A 250V SLOW BLOW	71400	MDL-1
	5060-1189	1	PWR LINE MODULE	28480	5060-1189

Table 6-2. 59301A Cabinet Parts

	HP PART NO.	QTY	DESCRIPTION	MFR. CODE	MFR. PART NO.
1	5040-7203	1	TRIM-TOP	28480	5040-7203
2	59301-00001	1	PANEL, FRONT	28480	59301-00001
3	5020-8813	1	FRAME, FRONT	28480	5020-8813
4	5040-7201	4	FOOT	28480	5040-7201
5	5040-7209	1	COVER-BOTTOM	28480	5040-7209
6	59301-00004	2	BRACKET MOTHER BOARD	28480	59301-00004
7	5040-7212	2	COVER-SIDES	28480	5040-7212
8	59301-00002	1	PANEL, REAR	28480	59301-00002
9	5040-7208	1	COVER-TOP	28480	5040-7208

Table 6-3. Manufacturers Code List

MFR. NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
01121	ALLEN BRADLEY CO.	MILWAUKEE, WIS.	53204
01295	TEXAS INSTRUMENTS INC. SEMICONDUCTOR COMPONENTS DIV.	DALLAS, TEX.	75231
02660	AMPHENOL CORP.	BROADVIEW, ILL.	60153
03508	G.E. CO. SEMICONDUCTOR PROD. DEPT.	SYRACUSE, N.Y.	13201
04713	MOTOROLA SEMICONDUCTOR PROD. INC.	PHOENIX, ARIZ.	85008
07263	FAIRCHILD CAMERA & INST. CORP. SEMICONDUCTOR DIV.	MOUNTAIN VIEW, CALIF.	94040
12040	NATIONAL SEMICONDUCTOR CORP.	DANBURY, CONN.	06810
28480	HEWLETT-PACKARD CO. CORPORATE HQ.	YOUR NEAREST HP OFFICE	
56289	SPRAGUE ELECTRIC CO.	N. ADAMS, MASS.	01247
71400	BUSSMAN MFG. DIV. MC GRAW-EDISON CO.	ST. LOUIS, MO.	63017
71744	CHICAGO MINIATURE LAMP WORKS	CHICAGO, ILL.	60640
71785	CINCH MFG. CO. DIV TRW INC.	ELK GROVE VILLAGE, ILL.	
72982	ERIE TECHNOLOGICAL PROD. INC.	ERIE, PA.	16512

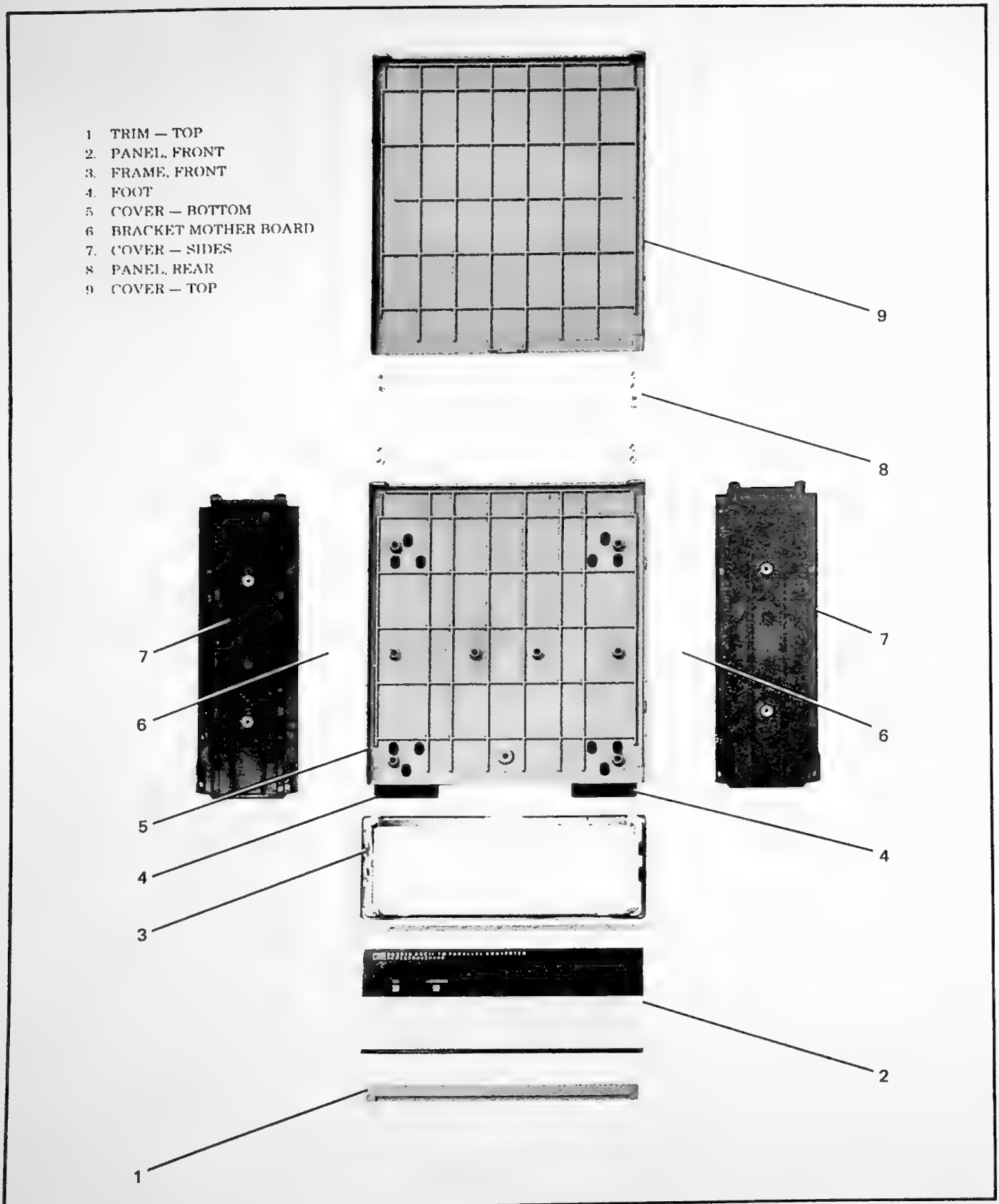


Figure 6-1. Cabinet Parts

SECTION VII

OPTIONS AND MANUAL CHANGES

7-1. INTRODUCTION

7-2. This section contains information necessary to adapt this manual to older instruments. As options are made available for this instrument, operating and installation instructions will be provided.

7-3. MANUAL CHANGES

7-4. This manual applies directly to Model 59301A having serial prefix 1328A (refer to paragraph 1-6).

7-5. Newer Instruments

7-6. As changes are made, newer instruments may have serial prefixes that are not listed in this manual. The manuals for these instruments are supplied with a manual change sheet, containing the required information. Contact the nearest Hewlett-Packard Sales and Service Office for information if this sheet is missing.

7-7. Older Instruments

7-8. To adapt this manual to instruments with serial prefix 1316A, make the following manual changes.

a. In Table 6-1, change the parts lists as follows:

1. Delete resistors A1R1, A1R13, and A1R18.

2. Delete transistor A1Q1.

3. Add A1CR5 1902-3082 DIODE BREAKDOWN: SILICON 4.64V, Mfr. Code 28480, Mfr. Part Number 1902-3082.

4. Add A1R19 0683-1525 R:FXD 1.5 kΩ 5% .250W, Mfr. Code 01121, Mfr. Part Number CB 1525.

b. In Figure 8-3, make the following changes:

1. Delete A1R1, A1R13, A1R18, and A1Q1.

2. Add a NAND gate (A1U20B) and make the following connections:
   a. Connect pin 6 of U20B to pin 9 of U19C and to pins 11 and 12 of U19D.
   b. Connect pin 4 of U20B to +5 volts.
   c. Connect pin 5 of U20B to J1 pin 23.

3. Add Zener Diode A1CR1 (part number 1902-3082) from pin 5 of U20B to common. Anode side of diode connects to common.

4. Add resistor A1R19 (part number 0683-1525) in parallel with Zener Diode A1CR1.

c. In Figure 8-3, replace component locator with Figure 7-1.

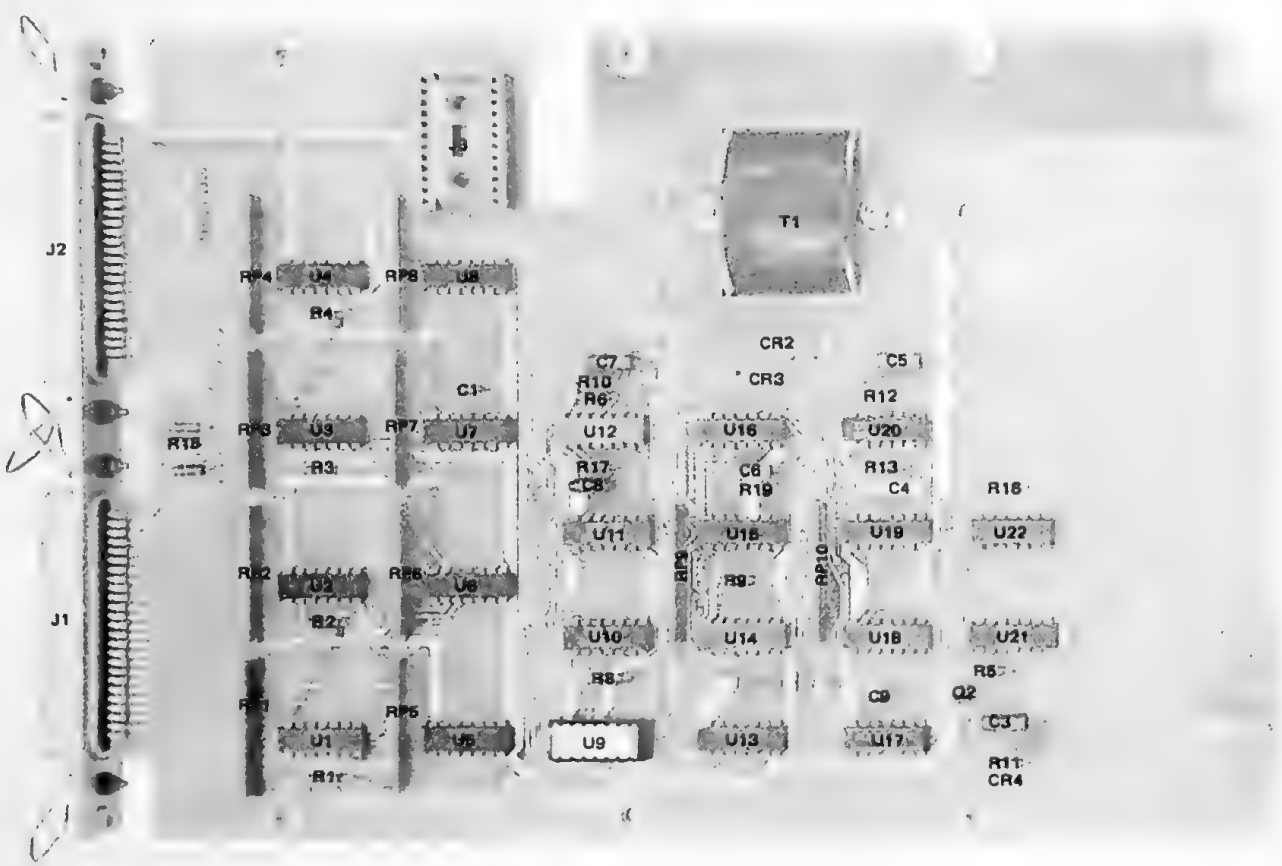


Figure 7-1. Parallel Output Board Assembly A1 (Series 1316A) Component Locator

SECTION VIII

SCHEMATIC DIAGRAMS

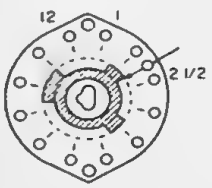
8-1. INTRODUCTION

8-2. This section includes schematic diagram notes (Figure 8-1), digital bus connector pin designations, component locators, and a schematic diagram for the 59301A ASCII to Parallel Converter.

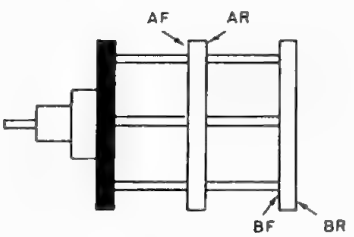
SYMBOLS

- FRONT PANEL
- REAR PANEL
- INTERIOR AND PC BOARDS
- WIPER MOVES TOWARD "CW" WHEN CONTROL IS ROTATED CLOCKWISE
- POWER LINE GROUND
- CIRCUIT COMMON GROUND
- FLOATING GROUND
- CHASSIS GROUND
- KNOB CONTROL
- SCREWDRIVER ADJUST
- MAIN SIGNAL PATH
- FEEDBACK PATH
- TEST POINT
- "AND" GATE
- "OR" GATE
- INVERTER
- NAND GATE
- NOR GATE
- EXCLUSIVE NOR

SWITCH DESIGNATIONS



A3S1		SWITCH S1 WITHIN ASSEMBLY A3
B		2ND WAFER FROM FRONT (A=1ST, ETC)
R		REAR OF WAFER (F=FRONT)
A3S1BR(2-1/2)	(2-1/2)	TERMINAL LOCATION (2½) (VIEWED FROM FRONT)



REFERENCE DESIGNATIONS

REFERENCE DESIGNATIONS WITHIN ASSEMBLIES ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION. JACKS ARE THE STATIONARY CONNECTORS AND PLUGS ARE THE MORE MOVEABLE OF TWO CONNECTORS.

ASSEMBLY	ABBREVIATION	COMPLETE DESCRIPTION
A25	C1	A25C1
A25A1	CR1	A25A1CR1
NO PREFIX	J3	J3

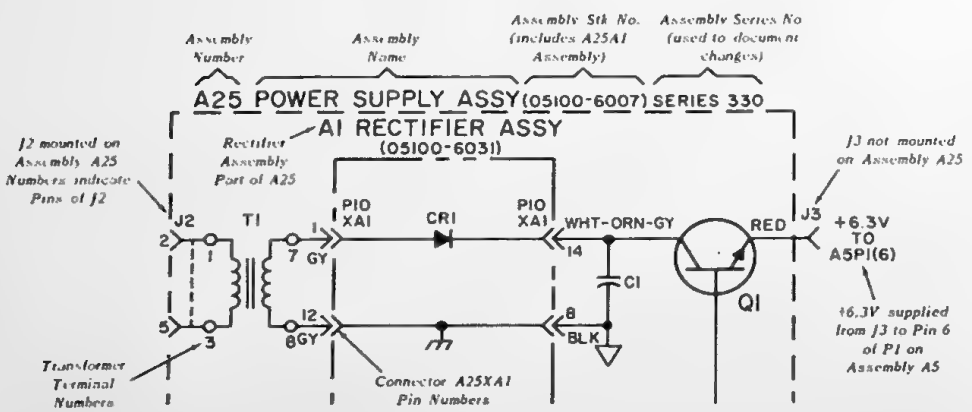
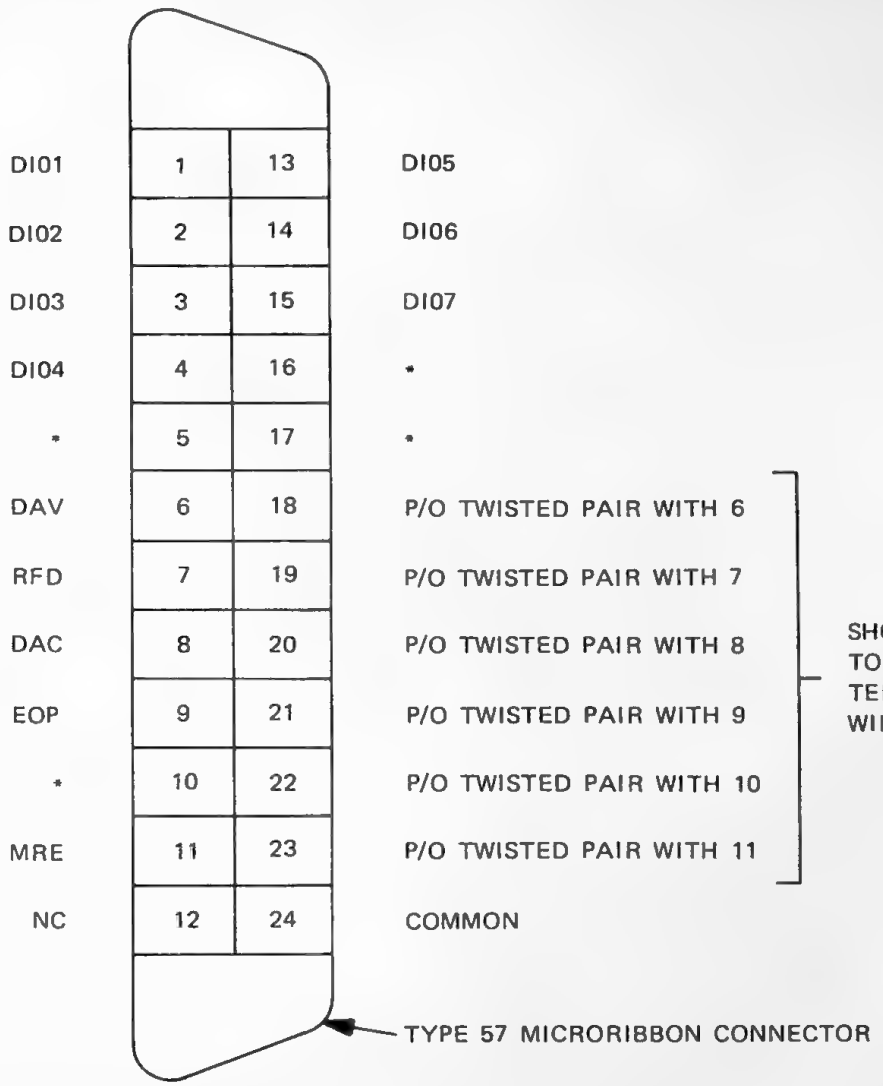


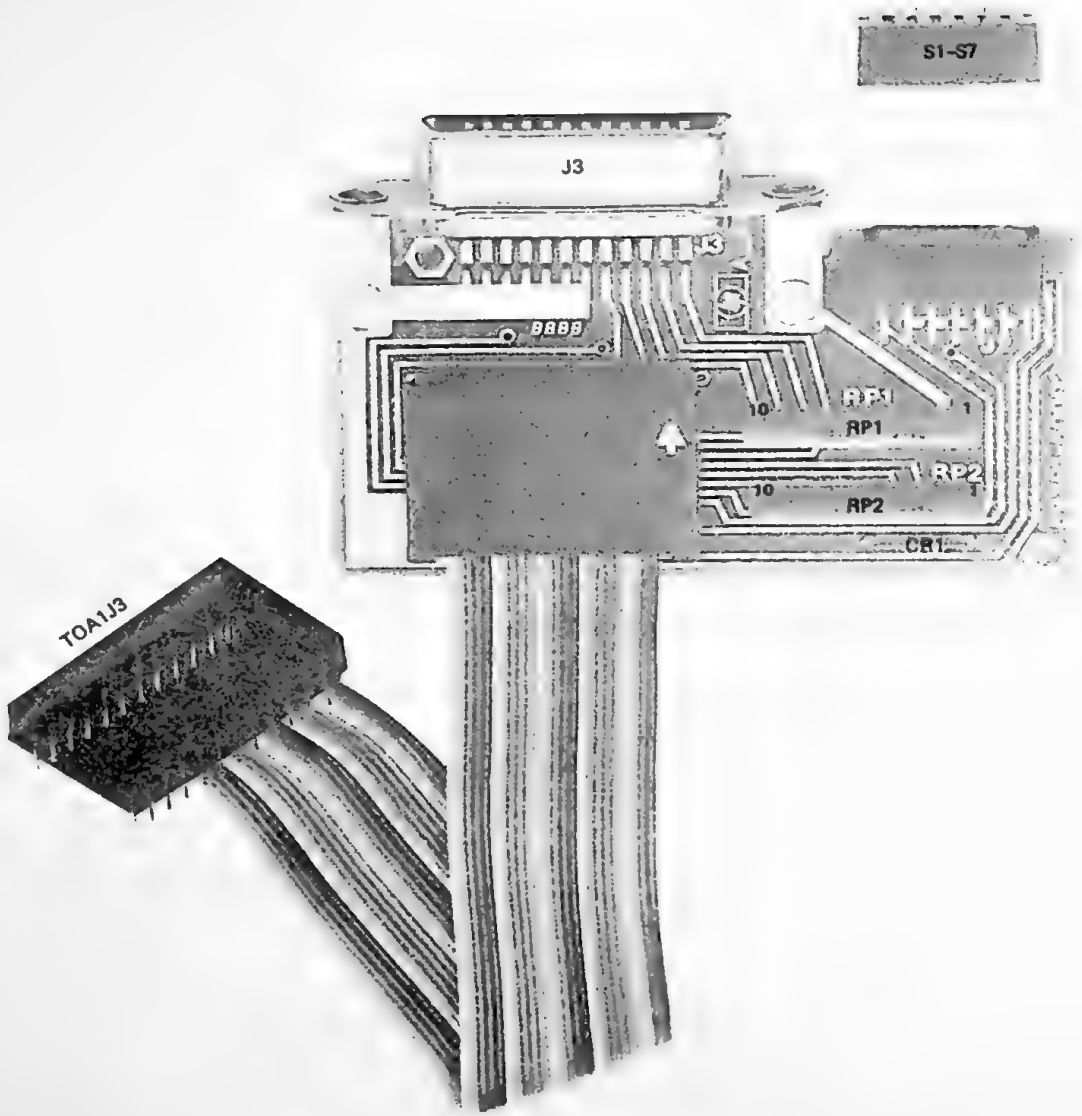
Figure 8-1. Schematic Diagram Notes



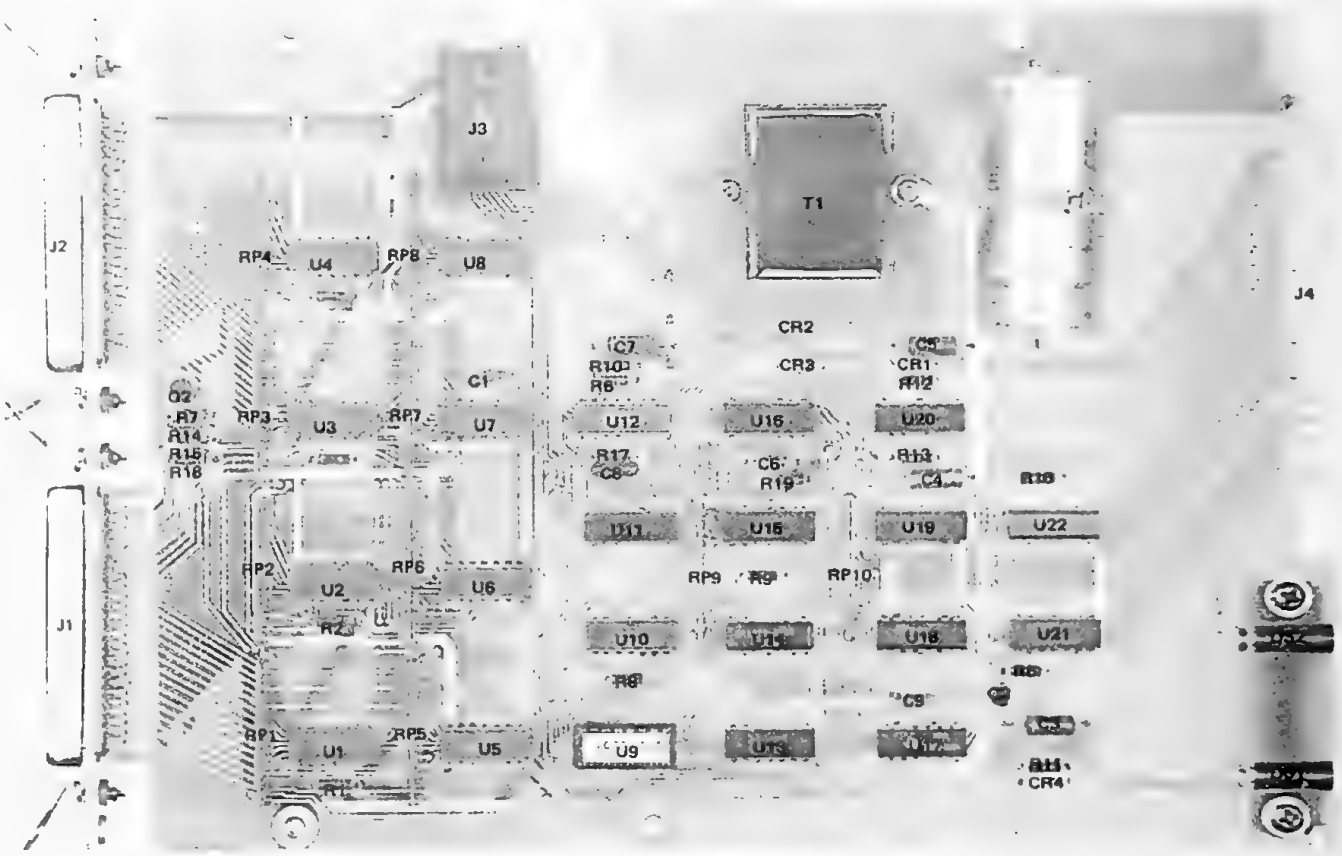
*THESE PINS ARE TERMINATED WITH RESISTIVE NETWORKS (SEE SCHEMATIC) AND NORMALLY FLOAT AT APPROXIMATELY 3V.

NOTE 1: PINS 18 THROUGH 23 SHOULD BE CONNECTED TO COMMON NEAR THE TERMINATION OF THE OTHER WIRE OF ITS TWISTED PAIR. PIN 12 IS CONNECTED TO COMMON ONLY AT THE CONTROLLER.

Figure 8-2. Digital Bus Connector Pin Designations



Part of Figure 8-3. 59301A Schematic Diagram


J3
T1
J2
J4
RP4
U4
RP8
U8
CR2
C7
R10
R6
CR3
C5
CR1
R12
C1
Q2
R7
RP3
U3
RP7
U7
U12
U16
U20
R14
R15
R16
R17
C8
C6
R19
R13
C4
R18
U11
U15
U19
U22
RP2
RP6
U2
U6
RP9
R9
RP10
J1
R2
U10
U14
U18
U21
R8
C9
RP1
U1
RP5
U5
U9
U13
U17
C3
R11
CR4
R1

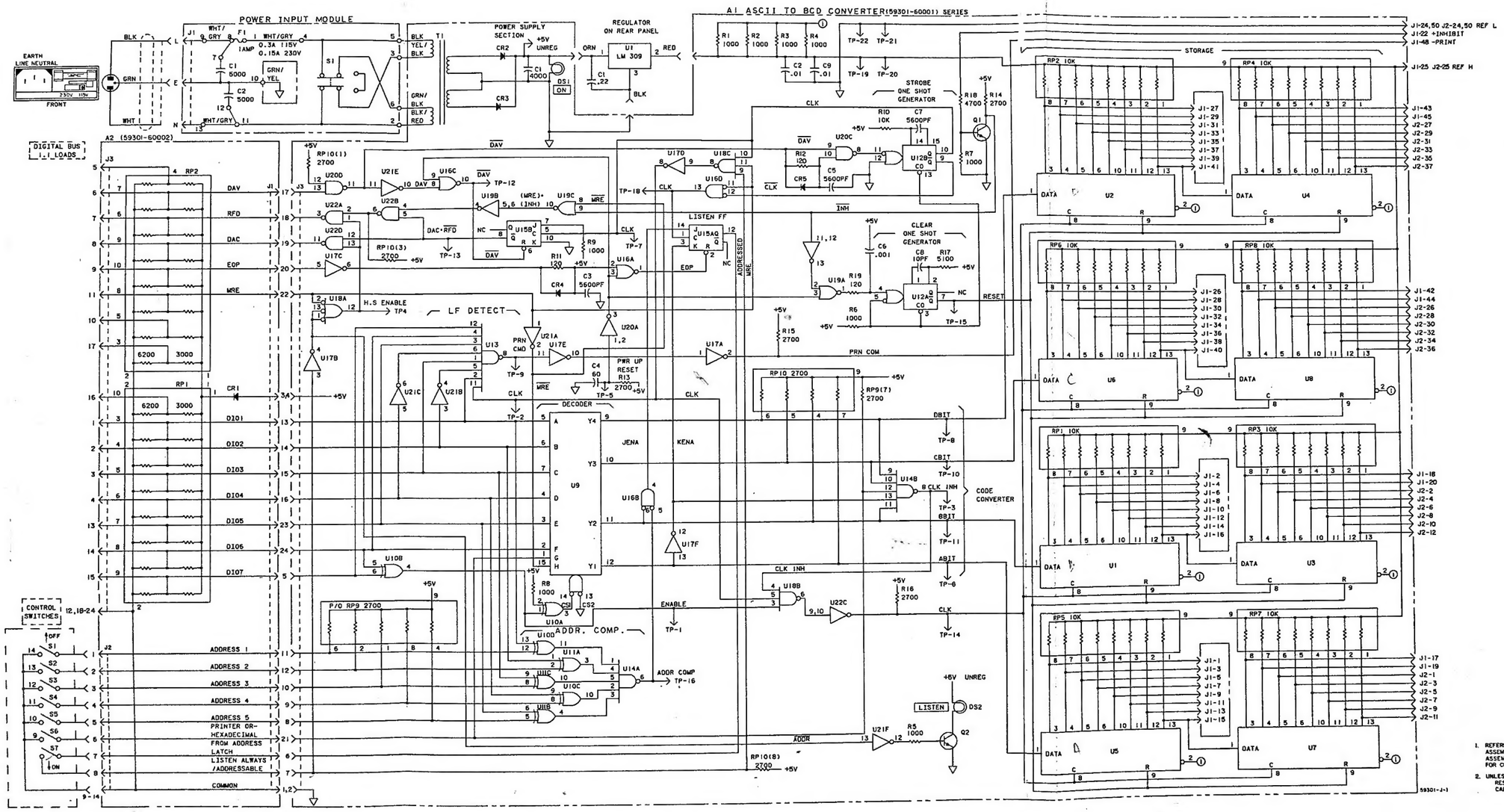
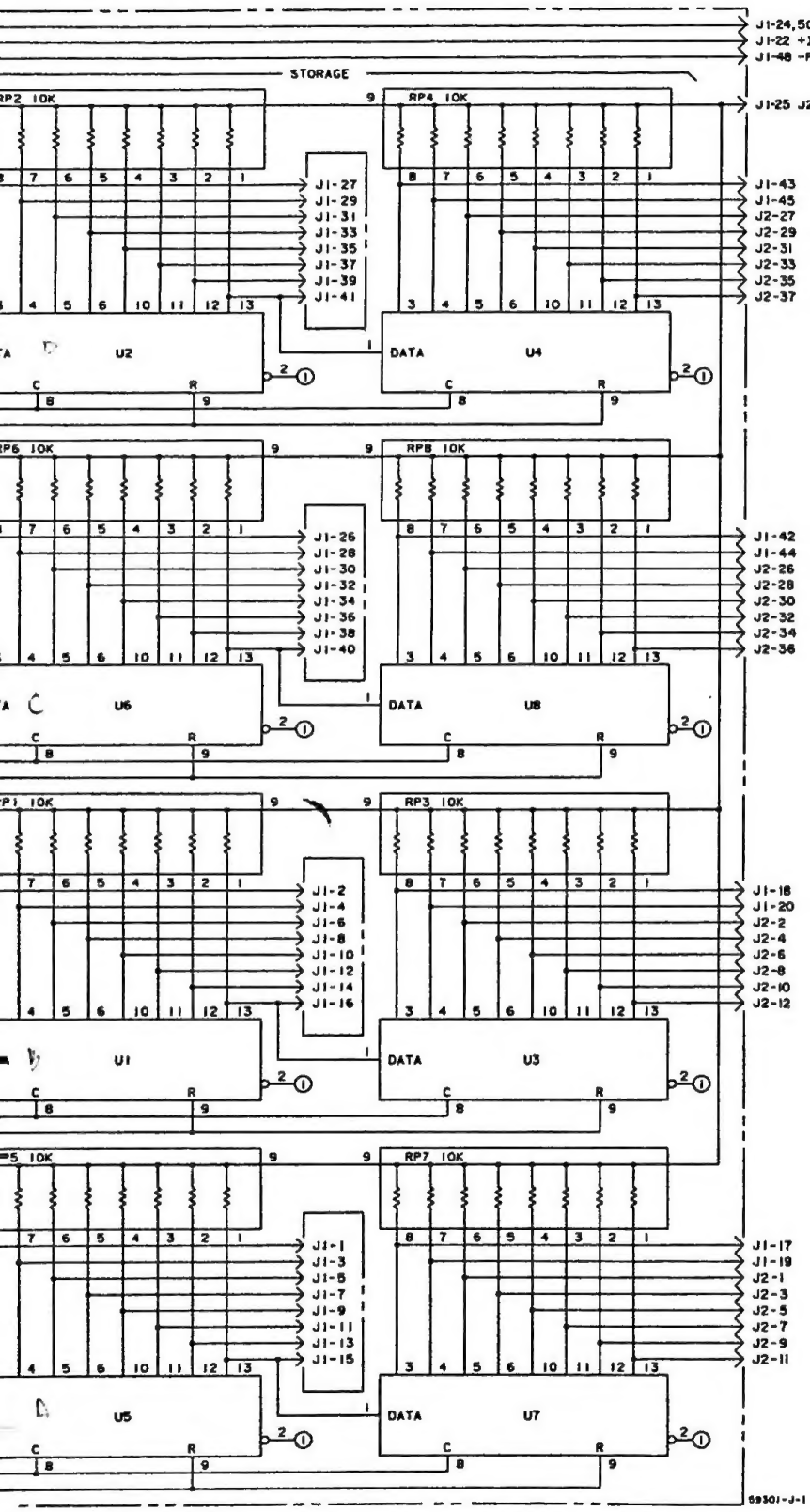


Figure 8-3
59301A SCHEMATIC DIAGRAM



NOTES

1. REFERENCE DESIGNATIONS WITHIN THIS ASSEMBLY ARE ABBREVIATED. ADD ASSEMBLY NUMBER TO ABBREVIATION FOR COMPLETE DESCRIPTION.
2. UNLESS OTHERWISE INDICATED: RESISTANCE IN OHMS; CAPACITANCE IN MICROFARADS

Figure 8-3
59301A SCHEMATIC DIAGRAM

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